

$$15) \log_4 x + \log_4 (x+6) = 2$$

$$\log_4 x^2 + 6x = 2$$

$$4^2 = x^2 + 6x$$

$$x=2 \quad 16 = x^2 + 6x$$

$$x^2 + 6x - 16 = 0$$

$$(x+8)(x-2) = 0$$

$$x = -8, 2$$

Bellwork: 5/23/13

Solve each equation for x:

$$1) \log_2 (3x-7) + \log_2 x = 3$$

$$\log_2 \frac{3x-7}{x} = 3$$

NO

SOLUTION

$$2^3 = \frac{3x-7}{x}$$

$$x \cdot 8 = \frac{3x-7}{x} \cdot x$$

$$8x = 3x-7$$

$$x = \frac{5x-7}{5} \quad \frac{5x-7}{5} = \frac{-7}{5}$$

$$2) \log_4 x + \log_4 (x-3) = \log_4 18$$

$$\log_4 x^2 - 3x = \log_4 18$$

$$x^2 - 3x - 18 = 0$$

$$(x+3)(x-6) = 0$$

$$x+3=0 \quad x-6=0$$

$$x = -3 \quad x = 6$$

Write each of the following in logarithmic form: need a log

1)  $3^4 = 81$   $\log_3 81 = 4$  2)  $64^{\frac{1}{3}} = 4$   $\log_{64} 4 = \frac{1}{3}$  3)  $7^{-2} = \frac{1}{49}$   $\log_7 \frac{1}{49} = -2$

Write each in exponential form: needs exp (no log)

4)  $\log_6 \left(\frac{1}{36}\right) = -2$   $6^{-2} = \frac{1}{36}$  5)  $\log_7 7 = y$   $x^y = 7$  6)  $\log_x x = -4$   $y^{-4} = x$

Write each expression as a single logarithm: log once

7)  $\log_2 120 \log_5 12.5$   $\log_2 60$  8)  $\log_3 16 \log_5 \frac{16}{5}$   $\log_3 \frac{16}{5}$   
9)  $\log_5 6 \log_3 4 \log_5 3$   $\frac{6 \cdot 4}{3}$   $\log_5 8$  10)  $2 \log_7 x + \log_7 5$   $x^2 \cdot 5$   $\log_7 5x^2$   
11)  $6 \log_4 x - 2 \log_4 y$   $\frac{x^6}{y^2}$   $\log_4 \frac{x^6}{y^2}$  12)  $\frac{1}{2} \log_5 25 + 3 \log_5 z$   $\log_5 25^{\frac{1}{2}} + \log_5 z^3$   $\log_5 5z^3$

one log = swirl

log = log cross out

Solve each equation for x. No decimal answers. Be sure to check for extraneous solutions.

13)  $\log_5 x = 3$   $5^3 = x$   $x = 125$  14)  $\log_2 16 = x$   $2^x = 16$   $x = 4$

15)  $\log_5 (5x - 6) = 3$   $5^3 = 5x - 6$   $125 = 5x - 6$   $131 = 5x$   $x = 26.2$  16)  $\log_2 (4x - 5) = \log_2 (2x - 1)$   $4x - 5 = 2x - 1$   $2x = 4$   $x = 2$

17)  $\log_4 4 \log_4 (x + 3) = 2 \log_4 5$   $\log_4 4(x + 3) = \log_4 5^2$   $4(x + 3) = 25$   $4x + 12 = 25$   $4x = 13$   $x = \frac{13}{4}$  18)  $\log_2 x \log_2 (x - 4) = 5$   $\log_2 x(x - 4) = 5$   $2^5 = x^2 - 4x$   $0 = x^2 - 4x - 32$   $x = 8, -4$

19)  $3 \log_2 4 + 4 \log_2 3 - 2 \log_2 6 = 2 \log_2 x$   $\log_2 4^3 \log_2 3^4 \log_2 6^{-2} = \log_2 x^2$   $\log_2 \frac{4^3 \cdot 3^4}{6^2} = \log_2 x^2$   $\log_2 144 = \log_2 x^2$   $x^2 = 144$   $x = 12, -12$  20)  $\log_4 (x + 1) \log_4 (x - 2) = \log_4 (x^2 - 9)$   $\log_4 (x + 1)(x - 2) = \log_4 (x^2 - 9)$   $x^2 - x - 2 = x^2 - 9$   $-x - 2 = -9$   $-x = -7$   $x = 7$

